DOPHE 136

HAZARDOUS MATERIALS

SWJFRRFP2A

BOX#

104 SW 8643

SW/JFR/RFP 2A
Incidents

From: "Engineering" <gestech@worldnet.att.net>
To: "Dennis DeForest2" <rldefodm@dolsmtp.dol.state.co....
Date: 4/30/98 7:16am
Subject: Rocky Flats Land Fill, Complaint by Mott re: Kasel, McAndrews, Repeto, Mittet, Batchelder-adams, & Sprenkle

Dear Ms. DeForest:

I would like to make you aware of another aspect of this situation that impacts the above noted complaint and, potentially, the public health issues, locally, nationally, and internationally, that are central to this engineering design problem.

There was a meeting held at the offices of RMRS on September 27, 1996.

All parties to this dispute were present with the exception of Mr.Ken Starr of Jefferson County. Mr. Starr was specifically not invited by RMRS though his presence was requested by myself.

During the course of this meeting, Mr. Repeto, PE, of Woodward-Clyde made a statement regarding the design of the riser assembles in the land fill and the general side slopes. Mr. Repeto said that this land fill was one of at least twenty-five (25) that Woodward-Clyde had designed and that were built with the identical design parameters.

This statement was made prior to the general acceptance by all qualified participants, several months later, that the Woodward-Clyde/Merrick design was seriously defective.

I have no verification that this defective design was in fact used prior to the failures at Rocky Flats. I can only depend on the actual statement made by Mr. Repeto on September 27, 1996.

I would think, however, that based on the seriousness and severity of the design errors committed by Mr. Repeto et. al., that it would be prudent to check on the locations of these other 24 land fills.

In the event that one or more of these projects were located within the State of Colorado, I recommend that Mr. Laudeman and Mr. Doak be asked to verify that the specific design used at Rocky Flats was or was not used in another land fill.

In the event that one or more of these other 24 land fills was located in some other state within the USA, I feel that you, or the solid waste department of the State (Doak and Laudeman) would be under some obligation to notify the appropriate state officials of events that have transpired here in Colorado.

In the event that one or more of these other 24 defective land fills are located outside the USA, I feel that we have an obligation to notify the appropriate officials in those countries.

Please inform me by return email that you have received this notification. Please also inform me if there is anything else I can do to make sure that this information is placed before the responsible officials.

Regards,

L. J. Mott, PE
Consulting Engineer
GES Tech Group, Inc.
gestech@worldnet.att.net

CC: "Steve Laudeman/HazMat" <steve.laudeman@state.co.u...

STATE OF COLORADO

Roy Romer, Governor
Patti Shwayder, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
http://www.cdphe.state.co.us/hm/

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198

Colorado Department
of Public Health
and Environment

March 9, 1998

Larry Mott
GES Tech Group, Inc.
P.O. Box 133
Calhan, Colorado 80808

RE: Rocky Flats Environmental Technology Site New Sanitary Landfill - Riser Pipe Assemblies

Dear Mr. Mott:

This letter is in response to your recent correspondence regarding the stability of the riser pipes at the above reference facility. As you may recall, much discussion has occurred with respect to the stability of the riser pipe assemblies. We have re-reviewed the stability calculations by Pedro Repetto of Woodward-Clyde dated October 3, 1996 and those by yourself also dated October 3, 1996. We also reviewed related correspondence, including your letter of October 8, 1996 and our letter of November 20, 1996.

Based on our review of these documents, we again come to the conclusion (as stated in our November 20, 1996 letter) that the riser pipes are stable. We will not issue a final position on this matter until we have received and reviewed the construction certification report.

Your correspondence also expressed worry that the observed separation of the riser pipes may not be corrected prior to the certification of the landfill. Our concern is that the final configuration of the riser pipe assemblies meet the requirements of Section 3.2.5 (D) of the solid waste regulations 6 CCR 1007-2 (the Regulations). Furthermore, in accordance with Section 3.2.7 of the Regulations, we must review and approve the construction quality assurance/quality control documentation for this facility prior to the acceptance of waste. Ultimately, if all valid concerns regarding the riser stability and other issues at the facility can be addressed by RMRS, we will confirm that the

designed construction has been completed in compliance with the Regulations and the approved design documents.

As of the date on this letter, we have not received the construction certification report from RMRS. As you have requested in the past, we will notify you when this document arrives at our office. Should you have additional questions concerning this matter, please do not hesitate to call either of the undersigned.

Sincerely,

Stephen Laudeman, P.E.
Geological Engineer
Solid Waste Unit
Compliance Program

Roger Doak
Geologist
Solid Waste Unit
Compliance Program

cc: Karen Berry, Jefferson County Planning Department
Ken Starr, Jefferson County Dept. Of Health & Environment
Tim Rehder, US EPA
Don Mittlestadt, RMRS
Steve Tarlton, HMWMD
Joe Rau, DOE Rocky Flats
Monica Sheets, AGO
Denise DeForest, AGO

sw/jfr/rfp 2a construction incidents

SW/JFR/RFP 2A
Construction incidents

From: "Engineering" <gestech@worldnet.att.net>
To: "Ken Starr" <kstarr@co.jefferson.co.us>
Date: 3/6/98 1:15pm
Subject: Land fill Riser Assemblies, Safety factors and failures

March 6, 1998

L. J. Mott, PE
GES Tech Group, Inc.
Box 133
Calhan, CO 80080

Voice: 719-347-0142
Fax: 719-347-0143

Ken Starr, PE
JefCo Health Dept.

Re: New Landfill, Rocky Flats

Dear Ken,

I would like to emphasis that the observed riser pipe "movement", what I refer to as the structural failure of the riser pipe assemblies, happened at less than 30% of the original design dead load (with landfill empty). The original design would have added a load equal to a 20 foot wide section of 12" deep class two fill, ten feet each side of the trench.

On top of that original design dead load, the accumulated waste load would have added to the axial compression in the pipes resting on the liners. That would be an enormous load, and, with this demonstrably defective design, very likely to penetrate the liners and damage the pipes due to compressive material failure.

It is obvious that all the consultants, regulators, and designers, thought that the riser pipes SHOULD remain "stable". The engineers or geologists that are on record as assuming the pipes were and would remain stable are: Doak and Laudeman (CO. St.), Repeto, Batchelder-Adams, and Millet (WC), Rinko and Corcoran (O&G), and Norman T. Ng-A-Oui (Gannett Fleming). There may be many others as well, for example, engineers and/or consultants for Merrick, Kaiser-Hill, RMRS, and DOE.

Since I was not made aware of all the meetings or correspondence that transpired after the original riser failure on Sept. 5, 1996, there very likely are many others that went on record as agreeing, or hoping, that the pipes were stable.

So, while all the geologists and engineers might have told you that the pipes SHOULD remain stable, the fact is that they did NOT remain stable. But we should not lose sight of the significance of this "movement". The fact is that these riser assemblies actually failed at less than 30% of design load. This is just one aspect of the grossly defective

Woodward-Clyde design that has not been receiving the proper amount of emphasis, in my opinion and, I might add, has not been corrected at this time.

Putting this into terms of safety factors, I submit that the intentionally falsified official (and P. E. sealed) stability calculations repeatedly offered by Repeto, Batchelder-Adams, and Millet and endorsed by several other engineers, should now, finally, be proven to be 100% wrong.

In other words, the riser assembly stability safety factor is really much less than one, and always has been less than one. In fact, my calculation of October 3, 1996, gives the safely factor of the original failed riser as 0.6, and of the final version approved by all designers and regulatory engineers/geologists as 0.7 (ref. 10/3/96 GES Calculation).

If you would like to check the record on this point, I refer you to my calculation and also, for an interesting comparison, the Repeto/Batchelder-Adams calculation of 10/3/96, sheets 12 through 16). Using intentionally falsified engineering assumptions and intentionally falsified engineering material properties, engineers Batchelder-Adams, Repeto and Millet, were able to conclude that the (now failed) riser stability safety factor is 1.98 (sheet 16 of 16).

It is also interesting to note that the actual (and predicted) failure mechanism of the risers is totally overlooked in the Batchelder-Adams, Repeto, Millet stability calculation. By way of illustration, let me point out that the 3.75 inch gap in the south leachate riser pipe implies one of the following possible conditions at the base of the riser:

1) Vertical penetration of the liners and contact between the future landfill leachate and ground water.

2) Shearing of the pipe boot horizontally along the liner surface with likely tearing of the liners and contact between waste leachate and ground water.

3) A seasonal build-up of compressive stress in the pipe. Of course, the pipe was not intended to carry this level of compressive stress (see Repeto & Batchelder-Adams) and a compressive or buckling failure would be likely. This would result in liner penetration and contact between leachate and ground water.

It should also be noted that even if the liner has not yet been penetrated, the implications of this riser pipe failure mechanism under waste load should be causing great concern within the community of designers, consultants, and regulatory agencies responsible for this land fill design and/or certification.

I will be monitoring the on going situation with these defective risers and will keep you informed of any new information.

If you have any questions on this matter, please do not hesitate to contact me at any time.

Regards,

L. J. Mott, PE
Consulting Engineer

cc: Angie Kinnaird, PE Board
Tim Rehder, EPA
Laudeman & Doak, Co. St. HazMat
Denise Deforest, Asst. Atty General, St. of CO
Joe Rau, DOE Rocky Flats (via mail)

CC: "Angeline Kinnaird" <angie.kinnaird@state.co.us>, ...

From: "Engineering" <gestech@worldnet.att.net>
To: "Ken Starr" <kstarr@co.jefferson.co.us>
Date: 2/23/98 10:54pm
Subject: Riser Assemblies, Rocky Flats Land Fill

Ken Starr
Jefferson County Health Dept.

Dear Ken,

Sorry that we were unable to talk today. Since I will be out of town until Friday, I will describe my concerns in more detail here.

It is apparent that a considerable amount of work and money has been expended on the cell side slopes, correcting the original design errors. These include removing the soil veneer, replacing damaged geonet and geomaterial (UV resistant) and adding thousands of used tires to hold the liner down in the wind. According to the others I spoke to today, the intention is to gain approval and/or certification for the land fill, but there are apparently no plans to ever use it. Though this logic seems somewhat strange, I am not concerned about this aspect.

I am concerned about the apparent situation regarding the riser pipe assemblies. The original failure in the south riser assembly (on Sept. 5, 1996) called attention to the defective Merrick/Woodward Clyde design. Contrary to my recommendations, this original defective design was repaired under specific instructions from RMRS/WC/Merrick and no effort was made to correct the defects. In effect, the calculations issued by Mr. Repeto of Woodward Clyde were apparently accepted by the regulatory agencies in spite of the fact that all technical assumptions used by Mr. Repeto, and all conclusions, have subsequently proven to be false.

Since that time, all energies have concentrated on the side slopes and the risers have been ignored.

As noted in my previous email, all four riser pipes have now failed under less than 30% of the
original design load (no veneer). The failure mechanism confirms my stability calculations issued on October 3, 1996, and proves the Repeto calculations to be false. With no waste in the cells, the accumulated riser trench static dead load is now resting on the riser pipe base assemblies, which is resting directly on the primary and secondary liners. Any additional dead load on the trenches due to waste will result in potentially enormous loads concentrated on the bases of the riser pipes and thus directly on the liners.

The Repeto calculations that attempted to prove that the riser pipes would not penetrate the liners were based on fictitious engineering principles and conveniently created material properties.

In short, the riser pipe assemblies are constructed based on the original defective design and all subsequent riser stability calculations provided by Mr. Repeto of W.C. should be considered as false.

Therefore, if the plan is to eventually "certify" the land fill, it will, in my professional opinion, be necessary to also redesign the riser pipe assemblies and to totally rebuild them in accordance with good engineering design and realistic stability calculations.

The redesign approach was suggested in my first report on Sept. 16, 1996, and in subsequent letters and meeting notes. In addition, my objections to the original design are well known and well documented.

I felt that it was necessary to bring this to your attention due to the apparent lack of any construction activity on the risers and the apparent lack of any plans to correct the original defective Repeto design prior to "certifying" the land fill.

If you have any questions on this matter, I will be back in the office on Friday.

Regards,

L. J. Mott, PE
Consulting Engineer

cc: Laudeman & Doak, St. of CO, Solid Waste, HazMat Div.
Denise Deforest, Asst. Atty. General, State of Colorado
Angeline Kinnaird, Program Administrator, PE Board
Tim Rehder, EPA

CC: "Tim Rehder" <rehder.timothy@epamail.epa.gov>, "De...

From: "Engineering" <gestech@worldnet.att.net>
To: "Steve Laudeman/HazMat" <steve.laudeman@state.co.u...
Date: 2/23/98 10:22am
Subject: Fw: Rocky Flats Land Fill Failure and Riser Assemblies Design Defect

Steve Lauderman & Roger Doak
CDPHE
Haz Mat & Waste Mang. Div.

Dear Steve & Roger

I have conducted three inspections of the landfill since my last report on this matter on April 17, 1997.

It would appear that the side slopes were redesigned and that new Geo material
is being installed.

There does not appear to be any activity on the defective riser assemblies.

I realize that I am not in the information loop on this matter, but I am concerned about this situation.

Please let me know what is planned for the risers prior to introduction of waste material.

Thank you.

Regards,

L. J. Mott, PE
Consulting Engineer

cc: Ken Starr
Denise Deforest, Asst. Atty. General

-----Original Message-----
From: Engineering <gestech@worldnet.att.net>
To: Tim Rehder <rehder.timothy@epamail.epa.gov>
Date: Monday, February 23, 1998 8:27 AM
Subject: Rocky Flats Land Fill Failure and Riser Assemblies Design Defect

Dear Tim,

We have moved the office out of the Denver Metro area.

My new voice line is: 719-347-0142

Fax: 719-347-0143

And email address is on this note.

I have a general question on the status of the land fill situation and a specific question on the EPA/JeffCo plans regarding the riser pipes.

All four pipes have moved down slope, with 3 breaking in tension at the top and one (north) sliding through the concrete base. Compression in these pipes currently ranges from 3.75 inches (south) to 2 inches. Movement appears to be continuing slowly as the system cycles thermally on a seasonal basis and the 12 inches of riser trench fill stabilizes structurally.

I wish to know if this dynamic condition remains under investigation by the appropriate agencies and I wish to know if the eventual addition of waste material has been factored into those considerations/calculations. Specifically, I wish to know if the designers/owners/operators are aware of the magnitude of axial compression that a 3.75 inch change in length signifies; what a 50 to 60 degree temperature increase will add to that value; and what the addition of waste material on the slope will add to that base value. And, finally, when all forces are summed, I wish to know if the primary and secondary liners can carry this load without being penetrated by the riser pipe base assembly.

If you desire details on the mechanism of riser pipe movement/compression, please refer to my earlier reports and comments that specifically predict this riser pipe/riser assembly behavior. In particular my calculations of 10/3/96 address the issue directly.

My concerns about the design of these riser assemblies is well known and very well documented.

In general, I wish to know if the riser assembly design defect identified in my earlier reports, and now confirmed by the physical evidence, is under continuing investigation by your organization.

Regards,

L. J. Mott, PE
Consulting Engineer

CC: "Tom Evered" <104543.3276@compuserve.com>

MEMORANDUM

TO: Roger Doak

FROM: Steve Laudeman

DATE: March 3, 1998

SUBJECT: Riser Stability at the New Rocky Flats Landfill

Due to recent correspondence from Larry Mott regarding the stability of the riser pipes at the new Rocky Flats Landfill, I have re-reviewed the stability calculations by Pedro Repetto of Woodward-Clyde dated October 3, 1996, and those by Mr. Mott dated also October 3, 1996. I also reviewed related correspondence, including Mr. Mott's letter of October 8, 1996, and our letter of November 20, 1996.

Based on my review of these documents, I again come to the conclusion (as stated in our November 20, 1996 letter) that I cannot agree with Mr. Mott's statement that the riser pipes are unstable. In general, it seems that the Woodward-Clyde riser stability calculations appear to use a valid engineering approach, similar to that presented by Dr. Koerner in his textbook "Designing With Geosynthetics", and in other soil mechanics texts. The main reason for the different results between Mr. Mott and Woodward-Clyde seems to be the difference in assumptions regarding the distribution of stress within the riser/backfill system. Woodward-Clyde assumes that the riser/backfill acts as a unit, with compressive (downslope) stresses acting through the pipe and the backfill together. On the other hand, Mr. Mott assumes that the riser pipe takes most if not all of the compressive stress, and he seems to disregard the soil altogether. The Woodward-Clyde approach seems to make more sense intuitively.

Regardless of which analytical approach is used, the actual performance of the risers is the best indication of stability. While Mr. Mott is unequivocal that the movement at the upper end of the pipes is evidence of "failure", it is entirely likely that the separation he has observed is due to thermal contraction of the pipes over the winter. In conversations with Dorothea Hoyt of RMRS last year, I recommended close monitoring of the riser/backfill system to determine if an overall instability were occurring. As you are aware, we have not heard from RMRS as to whether such monitoring took place. If such monitoring was performed, and if there was evidence of overall movement of the riser/backfill system (such as bulging near the toe of the slope or signs of slippage along the sides of the backfill), it would suggest that Mr. Mott is correct. On the other hand, I do not feel that movement at the upper ends of the risers, in and of itself, is indication of failure.

My recommendation is that we wait until the construction certification report is submitted. Due to the interest in the riser pipes, I suspect RMRS will include some discussion of prior construction issues and the separations that Mr. Mott has observed. After review of the certification report, we can determine if we will request any further analysis or remedial work on the risers.

cc: Steve Tarlton

File: SW/JFR/RFP/2A Construction Incidents

Construction Incidents SW/JFR/RFP 2A

Jefferson County Department of Health and Environment

Promoting Health and Preventing Injury and Disease

March 3, 1998

Mr. Joe Rau
Lead Infrastructure Team
Environmental Compliance Division
US Department of Energy Rocky Flats Field Office
Building 460
P.O. Box 928
Golden, Colorado 80402-0928

Re: Rocky Flats Environmental Technology Site New Sanitary Landfill

Dear Mr. Rau:

I have recently been informed by Jefferson County's Rocky Flats Environmental Technology Site New Sanitary Landfill (landfill) Quality Assurance Oversight Contractor, O'Brien & Gere Engineers, Inc. (O'Brien & Gere), that all repairs have been made to the landfill and that the project has been completed. However, I believe that some issues have not been adequately addressed with regard to riser pipe movement and landfill certification.

In the past, much discussion and documentation occurred with regard to the stability of the riser pipe assemblies and potential damage that could occur due to riser pipe movement. The calculations and discussions presented by the various consulting firms involved, indicated that long term stability of these riser pipes ***should*** not be a concern. This information was presented in October/November 1996, at which time no significant displacements of the riser pipes had been observed.

However, it appears that movement of these riser pipes has occurred since the October/November 1996 time period. O'Brien & Gere indicated in an April 29, 1997 Memorandum that, "A separation in the north leachate collection pipe at a weld approximately 1.5 feet down from the top concrete valve pit was observed, with a 1.5" to 2" separation. " In addition, they reported that, "The south leachate collection pipe reportedly was displaced approximately 1" to 2" down, based on Mr. Mittlestadt's observation of the pipe end's location along the wall of the valve building." According to O'Brien & Gere, additional movement has occurred since their April 29, 1997 inspection. O'Brien & Gere recently observed increased riser pipe movement and estimated the movement to be approximately 3 to 3.5 inches.

After the riser pipe movement was initially observed, it was my understanding that potential damage

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Fax: (303) 271-5702

Lakewood Offices:
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Lakewood, CO 80226
(303) 232-6301
Fax: (303) 239-7088

Arvada Offices:
6303 Wadsworth Bypass
Arvada, CO 80003
(303) 275-7500
Fax: (303) 275-7503

Conifer Offices:
Hwys. 73 & 285
Mountain Resource Center
Conifer, CO 80433
(303) 838-7552

Environmental Health:
260 S. Kipling Street
Lakewood, CO 80226
(303) 232-6301
Fax: (303) 239-7076

to the landfill liner system, due to this movement, would be investigated and/or addressed. To date, neither O'Brien & Gere nor I have received documentation regarding this issue. In addition, we have not been informed as to the status of the certification of this landfill.

If you or your staff has information regarding these issues, please transmit the documentation to me.

Thank you for your time and effort regarding this matter.

Sincerely,

Ken Starr, PE
Director, Environmental Compliance Division

cc: Jefferson County Government
Mark B. Johnson, MD, MPH / Health and Environment
Kathe Bjork, DVM, MSPH / Health and Environment
Karen Berry / Planning & Zoning
Tim Rehder / US EPA Region VIII
Roger Doak / CDPHE
Steve Laudeman, PE / CDPHE
John Rinko, PE / O'Brien & Gere
file